

BIOLOGICAL EVALUATION
Mountain Pine Beetle Infestation
in Ponderosa and Lodgepole Pine
Ashley National Forest
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Manila Ranger District
Ashley National Forest
Region 4
Utah

1972

INTRODUCTION

The mountain pine beetle continues to kill lodgepole and ponderosa pine throughout the Manila Ranger District in the northeast end of the Forest. Part of the infestation is in the Flaming Gorge National Recreation Area.

This area has a long history of mountain pine beetle outbreaks, with existing records showing control activities as early as 1931. Since then, repeated efforts have been made to control the beetle with the most intensive, concerted effort undertaken from 1961 to 1964. During this period, more than 50,000 trees were individually treated with chemicals in an attempt to reduce tree killing and contain the spread of the infestation. Unfortunately, these efforts probably did no more than prolong the inevitable. Today, it is highly possible that we are experiencing the consequences of this past control effort.

GENERAL INFORMATION

INSECT: Mountain pine beetle, Dendroctonus ponderosae Hopkins.

HOST TREES: Lodgepole pine, Pinus contorta Dougl., and ponderosa pine, Pinus ponderosa Laws.

LOCATION: Manila Ranger District and Flaming Gorge National Recreation Area, Ashley National Forest.

TYPE OF DAMAGE: Killing of ponderosa and lodgepole pine.

EXTENT OF DAMAGE: For the past 6 years, the extent of the infestation has remained essentially unchanged. Tree mortality is occurring from Hickerson Park, east across the south boundary of the National Recreation Area, to the Forest boundary (see appended map). The heaviest concentration of tree killing is in the lodgepole pine stands in the Ute Mountain area (Figure 1). Much farther east, group killing of ponderosa pine is occurring near Greendale Junction (Figure 2) and

in inaccessible lodgepole pine stands under Speir's Peak. The widely scattered outbreak in ponderosa pine east of Cart Creek has subsided naturally--at least for the time being.

BIOLOGICAL INFORMATION

An aerial reconnaissance of the infestation area was made in August and followed up by an on-the-ground evaluation survey during the period of September 12-14. Attack ratio surveys were conducted in six areas. Affected trees were counted, differentiated as to year of attack, and their diameters measured and recorded. General observations were made as to tree growth, bark beetle abundance and stage of development, and the presence and relative abundance of natural enemies; namely parasites and predators. In some areas, specifically around Greens Lakes and Bootleg Campground (Figure 3), no recent (1972) attacked trees were found.^{1/}

Attack ratios indicate increasing trends in most areas, except in the Ute Mountain area and in one area near Greendale Junction. Brood development and activity in the freshly attacked trees ranged from attacking adults, newly excised egg galleries with and without eggs, to young larvae. All stages (parent adults, eggs, and larvae) will overwinter and resume activity next spring. No natural control factors were observed, other than host tree depletion in some areas, that would portend a significant reduction in either the bark beetle population or its potential.

DISCUSSION

Most of the low elevation (below 8,000 feet) ponderosa and lodgepole pine stands on the Manila Ranger District are highly vulnerable to bark beetle attacks. The current area of infestation, for the most part, is made up of almost contiguous stands of mature and overmature ponderosa and lodgepole pine. The growing season is short, the sites are poor, and the unmanaged stands are exceptionally slow growing. For example, radial increment borings were taken at d.b.h. from each of five freshly attacked ponderosa pines in one area. The pole-sized trees, just opposite Greendale Junction, were in a group but relatively open grown. Diameters ranged from 7 to 10 inches and averaged 8 inches. All trees showed an initial period of relatively "rapid growth," but in less than a decade, growth started to decrease and continued to decrease each year until their death. An analysis of growth increment showed that on the average, the five trees added only 1 inch of wood to their radiuses during the past 44 years (Figure 4). Both lodgepole and ponderosa pine

^{1/} One new fader (possible 1971 attack) was observed near the Bootleg sewer lagoon, but the surrounding trees were not examined.

exhibited essentially this same growth pattern throughout the infestation. In some of the larger residual trees, such as that shown in Figure 5, the last inch of increment was so tight that it was impossible to discern individual growth rings, even with the aid of a 10X hand lens. It was estimated that some of these specimens took 80 to 90 years to produce the ultimate inch, and that many were 250-300 years old. Most of the stands, however, are between 90 and 130 years old. In the absence of some form of silvicultural manipulation, such as thinning, the beetle and other agents will continue to deplete these stands until they are naturally converted to a less susceptible state.

Experience has shown that there is virtually no adverse reaction by the general public on the esthetic quality of stands under attack or depleted by the mountain pine beetle. National Park Service personnel from Grand Teton and Bryce Canyon National Parks, who have experienced long-standing and severe mountain pine beetle outbreaks, confirm this philosophy. The only real impact, they say, is the cost and effort to remove hazard trees from campsites and other populated areas. Both Parks have initiated very subtle but highly effective interpretative programs which explain the beetle and its damage as a purely natural phenomenon.

In the Greendale Junction area, tree killing will continue to increase in 1973. Both large and small diameter ponderosa pines will be killed without much preference as to size. In all instances, mortality will occur in groups. One group above the highway contains at least 75 trees. This outbreak, in the absence of any concerted control effort, will maintain a relatively high level of tree killing for 2 more years, then subside. Impact data taken in the aftermath of a recent infestation in Bryce Canyon National Park showed total stand losses to be in the neighborhood of 14 percent of trees 5 inches d.b.h. and larger. Exceptionally low stand vigor, overstocking, generally poor growing conditions, and an aggressive beetle population may cause even higher losses in most areas of the Manila District.

Some relief from continued tree killing is in sight for the Ute Mountain-Half Moon Park areas, but an increase is predicted for portions of the Long Park area. In the Ute Mountain-Half Moon Park area, the decrease is due, principally, to host tree depletion. In the Long Park area, there is sufficient host material to carry the infestation at a relatively high level for the next 2 years. Winter salvage logging has been undertaken in portions of these areas, with a 1-MM-board-foot sale planned for the Long Park area in F.Y. 1974.

RECOMMENDATIONS

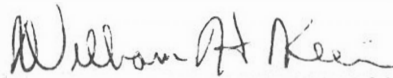
Various control alternatives and concepts and their application to the present infestation in the Manila Ranger District have been discussed at length in past evaluation reports. The point was made that individual tree treatment, whether it be spraying with chemicals or fall, peel, and burn, will not affect long-term control. Individual tree control, at best, will only extend the life of the infestation: however, in the final count, tree losses will be the same. Alternatives to this method, some of which will effect long-range control, follow:

1. Converting the highly vulnerable mature and overmature stands to a state of low susceptibility is the ultimate bark beetle control technique. In areas where timber cutting is not prohibited or objectionable, remove the largest and oldest trees. The capability of winter over-the-snow logging makes this the ideal method for many areas, particularly in some of the relatively open-grown ponderosa pine stands. A first rate example using this method has already been demonstrated in the Greendale Junction area. Unmanaged stands, it must be remembered, will always provide a source of infestation.
2. Many of the most densely stocked, slow-growing, pole-size ponderosa pine stands should be thinned. Ponderosa pine, once released, will respond, and a properly thinned stand (50%-60% of optimum basal area) will incur minimum mountain pine beetle damage. Stands visible from main roads or near scenic areas should receive lighter treatment.
3. Salvage as many of the dead and beetle infested (1972 attacks) trees as possible. The infested trees should be removed prior to June 1973. Removing the infested trees has the same effect as treating the trees with chemicals, although there is one advantage--a resource is utilized that would otherwise have been lost. An entomologist will be available to train personnel in spotting infested trees.
4. In areas of high use and value, such as Bootleg Campground, individual trees can receive a high degree of protection by spraying their boles with a preventive insecticide prior to beetle flight. Hopefully, a registered insecticide will be available for use early in 1973. Cost of treatment will range from \$1-\$2 per tree. Only the largest and most desirable trees should be treated, such as shown in Figure 5.
5. As an aid to the public, a modest interpretative display depicting the beetle as a natural component of the environment, should be erected at some vantage point near or in the infestation area.

Two possible locations would be near Greendale Junction (Figure 6) or at Cart Creek Overlook. We can supply relevant photographs and provide other assistance as required.

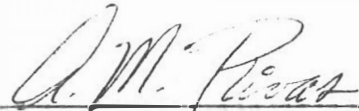
6. The death of many overmature ponderosa pines in Bootleg Camp-ground and other recreation sites is inevitable. One effective, long-term solution to this anticipated decrease in tree cover is to stock the areas now with drought resistant exotics, such as ashes, elms, and Russian olive. If sapling-size trees are established now and cared for in their early years, they will provide shade and esthetic enjoyment within 8 to 10 years. Being exotic, they would be free of native insects and diseases, thus increasing their survival and longevity.

Prepared by:



WILLIAM H. KLEIN, ENTOMOLOGIST
Branch of Forest Pest Control

Recommended by:



A. M. RIVAS, BRANCH CHIEF
Branch of Forest Pest Control

Approved by:



MARLIN C. GALBRAITH
Assistant Regional Forester
Division of Timber Management

TABLE 1

Attack Ratios in Ponderosa and Lodgepole Pines

Manila Ranger District
Ashley National Forest
1972

Area	Number of Attacks						Combined Attack Ratio ^{1/}	Ave. DBH ^{2/}				Infes- tation Inten- sity ^{3/}	Trend
	Ponderosa		Lodgepole		Combined			1972		1971			
	1972	1971	1972	1971	1972	1971		PP	LP	PP	LP		
Greendale #1	24	29	-	-	24	29	0.9:1	12.0	-	12.1	-	M	Static
Greendale #2	69	40	17	9	86	49	1.8:1	11.3	12.7	11.0	12.7	M	Increasing
Greendale #3	77	24	-	-	77	24	3.2:1	9.9	-	11.7	-	M	Increasing
Bootleg	-	-	-	-	-	-	-	-	-	-	-	-	-
Ute Lookout	-	-	33	79	33	79	0.4:1	-	10.8	-	10.1	M	Decreasing
Long Park	-	-	49	31	49	31	1.6:1	-	10.4	-	9.5	M	Increasing

^{1/} Ratio of new attacks to old; i.e., a ratio of 0.5:1 indicates one 1972 attack to two 1971 attacks.

^{2/} Weighted average.

^{3/} M = medium.



Figure 1. Lodgepole stand near Ute Mountain under attack by the mountain pine beetle.



Figure 2. Aerial view of the predominantly ponderosa pine stand east of Greendale Junction. Tree killing will increase in this area in 1973.



Figure 3. Aerial photo of Bootleg Campground. One "fader" is visible in the extreme right-hand edge of the photo. Trees in a high value area such as this can be protected by a preventive spray.

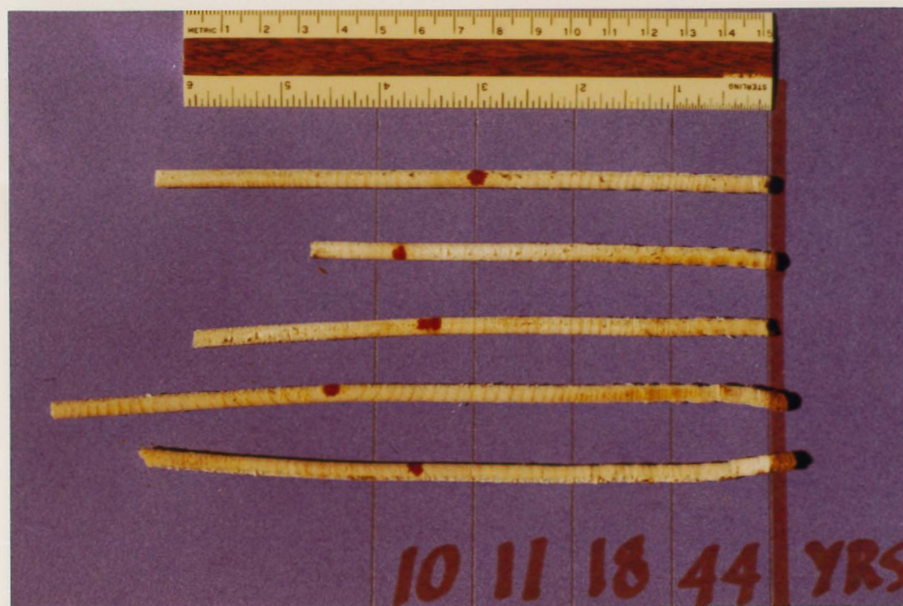


Figure 4. Increment cores taken from five pole-size ponderosa pine recently infested by the mountain pine beetle. The red dots indicate the relative position of the pith. These five trees, on the average, took 44 years to produce the last inch of radial growth.

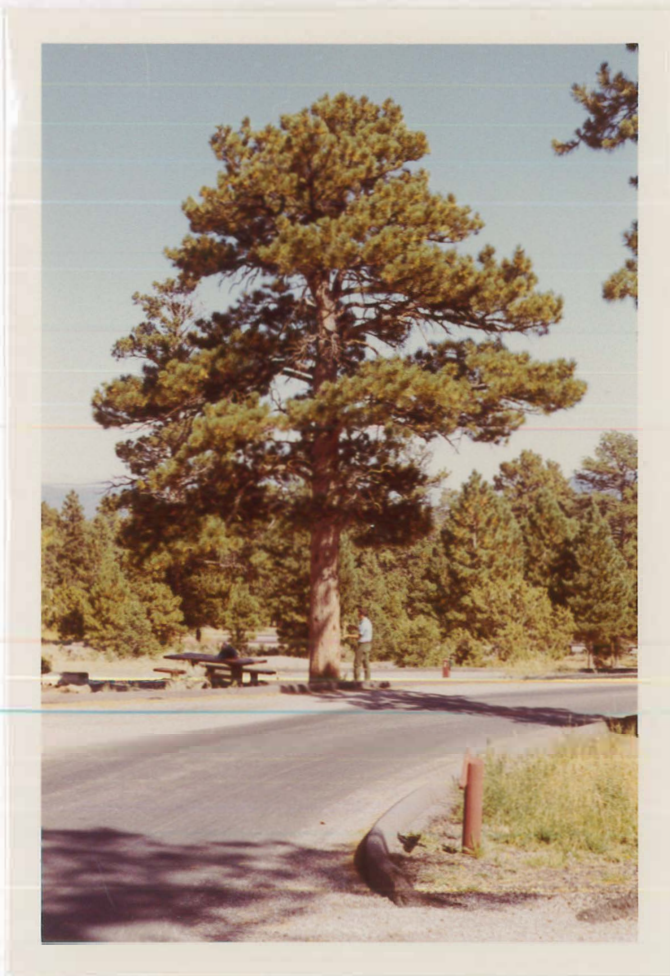


Figure 5. This slow-growing, overmature ponderosa pine is the sole source of shade for this campsite. This is the type of tree that should be "protected."



Figure 6. View of mountain pine beetle infestation from Highway 44 just east of Greendale Junction. Near this site would be a good location for an interpretative display.

